H·A

| Notice of Allowability | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/511,956 | PARK, KYE-JUNG | |
| | Examiner | Art Unit | |
| | Victor J. Taylor | 2863 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--***

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *18 October 2004*.

2. ☒ The allowed claim(s) is/are *1-9*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *3/14/2006* .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

## DETAILED ACTION

### *Drawings*

1. The drawings were received on 18 October 2004. These drawings are approved.

### *EXAMINER'S AMENDMENT*

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3. Authorization for this examiner's amendment was given in a telephone interview with Dr. Harry Lee, Reg. No. 56,814 on 14 March 2006.

4. The application has been amended as follows:

I. In the claims filed on 18 October 2004 amend claims 1-9 as shown below.

Claim 1. (Currently amended) A method for automatically compensating for an unbalance correction position and an unbalance correction amount in a balancing machine, comprising the steps of:

~~an unbalance testing procedure for~~

(1-i) measuring an unbalance amount and an unbalance position of a rotor completing a primary unbalance correction thereof;

~~an initial unbalance amount determining procedure for~~

(1-ii) determining whether ~~or not an~~ the initial unbalance amount ~~present~~ before the unbalance correction is ~~not more than a predetermined value corresponding to an unbalance amount~~ within the range of set value which is correctable by ~~a~~ one-time correction;

~~a counting procedure for~~

(1-iii) incrementing ~~a counted value~~ counter ~~when~~ if it is determined ~~in the initial unbalance amount determining procedure~~ that the initial unbalance amount is ~~not more than the predetermined~~ within the range of set value in step (ii);

~~a good-quality determining procedure for~~

(1-iv) determining whether ~~or not~~ the unbalance amount measured in ~~the unbalance testing procedure~~ step (i) is ~~more~~ larger than a good-quality reference value for determining whether ~~or not~~ the rotor has ~~a~~ bad quality or good quality;

~~an angular deviation measuring procedure for~~

(1-v) measuring ~~an~~ angular deviation between ~~an~~ the unbalance ~~position~~ positions of before and after the unbalance correction ~~and the unbalance position after the unbalance correction~~ when ~~it is determined in the good-quality determining procedure that~~ the measured unbalance amount is ~~more~~ larger than the good-quality reference value in step (1-iv);

~~an angular deviation range determining procedure for~~

(1-vi) determining whether the angular deviation of the unbalance ~~position~~ positions measured in ~~the angular deviation measuring procedure~~ step (1-v) is ~~within a range of~~ 0° ± X1° ~~(0 < X1 < 5), a range of~~ and 180° ±X1° (0 < X1 < 5) [[,]] or ~~a range of~~

0° +X2° ~~(X1 < X2 < 90), a range of~~ and 180° +X2° (X1 < X2 < 90), ~~a range 0° -X2° , or a range of 180° -X2°~~; and

~~an unbalance correction position and amount compensating procedure for, when the counted value reaches a predetermined value for calculation of an average value,~~

(1-vii) compensating unbalance correction position and amount, further comprising the steps of:

(a) comparing the number of times when the angular deviation of the unbalance position is ~~within the range of~~ 0° +X2° ~~or~~ and 180° +X2° with the number of times when the angular deviation of the unbalance position is ~~within the range of~~ 0° -X2° ~~or~~ and 180° -X2° when the counter from step (iii) reaches the value set by an operator for calculation of average value,

(b) ~~angularly~~ compensating the angle for ~~the unbalance correction position based on the~~ differences in angular deviation ~~of the unbalance position associated with a higher number one of the compared ranges~~ according to the larger number of times in step (a),

(c) comparing the number of times when the angular deviation of the unbalance position is ~~within the range of~~ 0° ±X1° ~~in accordance with an~~ which occurs when insufficient unbalance correction is achieved at an accurate correction position with the number of times when the angular deviation of the unbalance position is ~~within the range of~~ 180° ±X1° ~~in accordance with an~~ which occurs when excessive unbalance correction is achieved at an accurate correction position, and

(d) compensating for the unbalance correction amount ~~in accordance with a higher-number one of the ranges of 0° ±X1° and 180° ±X1° to increase~~ by increasing the unbalance correction amount ~~when the higher-number range is~~ if the number of times for 0° ±X1° is larger ~~while~~ or by reducing the unbalance correction amount ~~when the higher-number range is~~ if the number of times for 180° ±X1° is larger.

Claim 2. (Currently amended) The method according to claim 1, wherein ~~it is determined in the good-quality determining procedure whether or not the rotor has a good-quality, based on a value obtained by deducting, from the good-quality reference value,~~ in step (1-iv), determining the quality of the rotor by subtracting the ~~a~~ value optionally set ~~for an improvement in~~ to improve the accuracy of ~~a~~ cutting depth from the good-quality reference value for the unbalance correction.

Claim 3. (Currently amended) The method according to claim 1, further comprising the steps of:

~~a correction amount re-setting procedure for~~

(3-i) dividing ~~a~~ an unbalance amount range which is measurable prior to the unbalance correction into a plurality of sub-ranges,

(3-ii) executing the ~~unbalance testing procedure through the angular deviation range determining procedure~~ steps of (1-i) to (1-vi) for each of the unbalance amount sub-ranges to compare the number of times when the angular deviation of the

unbalance position is ~~within the range of~~ 0° ±X1° with the number of times when the angular deviation of the unbalance position is ~~within the range of~~ 180° ±X1°, and

(3-iii) re-setting an unbalance correction amount for the unbalance amount sub-range in accordance with ~~a higher number one of the ranges of 0° ±X1° and 180° ±X1°~~ the higher number of times in step (3-ii).

Claim 4. (Currently amended) The method according to claim 1, further comprising:

~~a procedure for~~

(4-i) displaying a current condition of the balancing machine including a finally determined unbalance position error range, a rate of products having a good quality, and a correction amount error; and

~~a procedure for~~

(4-ii) automatically stopping an operation of the balancing machine in accordance with a self determination of the balancing machine when a current machine condition value reaches a predetermined value at which it is impossible for the balancing machine to operate, and warning ~~an~~ the operator of the current machine condition.

Claim 5. (Currently amended) The method according to claim 1, wherein the compensation for the unbalance correction position in ~~the unbalance correction position and amount compensating procedure~~ step (1-vii) is carried out by correcting only the unbalance correction amount.

Claim 6. (Currently amended) The method according to claim 1, wherein the compensation for the unbalance correction position in ~~the unbalance correction position and amount compensating procedure~~ step (1-vii) is carried out by correcting both the unbalance correction position and the unbalance correction amount based on a value obtained by vector-calculating the measured unbalance position and unbalance amount.

Claim 7. (Currently amended) The method according to claim 1, wherein the compensation for the unbalance correction position in ~~the unbalance correction position and amount compensating procedure~~ step (1-vii) is carried out by repeatedly performing the unbalance correction under condition in which the unbalance correction position is optionally shifted with reference to 0° or 180°, storing a correction rate at every unbalance correction, calculating a maximum one of stored correction rates, and correcting the unbalance correction position based on the calculated maximum correction rate.

Claim 8. (Currently amended) The method according to claim 1, further comprising:

~~a basic data storing procedure for~~ storing, as basic data, cutting data exhibiting a predetermined high correction rate or more so that the basic data is used as recovery data when a degradation in correction rate occurs.

Claim 9. (Currently amended) The method according to claim 8, further comprising:

~~an automatic basic data recovering procedure for~~ automatically recovering the stored basic data as cutting data when the correction rate is reduced to a predetermined value.

5. For the record, the clear copy of the amended claims is as follows.

**AMENDED CLAIMS (CLEAN COPY)**

6. 1. (Currently amended) A method for automatically compensating for an unbalance correction position and an unbalance correction amount in a balancing machine, comprising the steps of:

(1-i) measuring an unbalance amount and an unbalance position of a rotor completing a primary unbalance correction thereof;

(1-ii) determining whether the initial unbalance amount before the unbalance correction is within the range of set value which is correctable by ~~a~~ one-time correction;

(1-iii) incrementing counter if it is determined that the initial unbalance amount is within the range of set value in step (ii);

(1-iv) determining whether the unbalance amount measured in step (i) is larger than a good-quality reference value for determining whether the rotor has ~~a~~ bad quality or good quality;

(1-v) measuring angular deviation between the unbalance positions of before and after the unbalance correction when the measured unbalance amount is larger than the good-quality reference value in step (1-iv);

(1-vi) determining whether the angular deviation of the unbalance positions measured in step (1-v) is 0° ± X1° and 180° ±X1° (0 < X1 < 5) or 0° +X2° and 180° +X2° (X1 < X2 < 90); and

(1-vii) compensating unbalance correction position and amount, further comprising the steps of:

(a) comparing the number of times when the angular deviation of the unbalance position is 0° +X2° and 180° +X2° with the number of times when the angular deviation of the unbalance position is 0° -X2° and 180° -X2° when the counter from step (iii) reaches the value set by an operator for calculation of average value,

(b) compensating the angle for differences in angular deviation according to the larger number of times in step (a),

(c) comparing the number of times when the angular deviation of the unbalance position is 0° ±X1° which occurs when insufficient unbalance correction is achieved at an accurate correction position with the number of times when the angular deviation of the unbalance position is 180° ±X1° which occurs when excessive unbalance correction is achieved at an accurate correction position, and

(d) compensating for the unbalance correction amount by increasing the unbalance correction amount if the number of times for 0° ±X1° is larger or by reducing the unbalance correction amount if the number of times for 180° ±X1° is larger.

2. (Currently amended) The method according to claim 1, wherein in step (1-iv), determining the quality of the rotor by subtracting the value optionally set to improve the accuracy of cutting depth from the good-quality reference value for the unbalance correction.

3. (Currently amended) The method according to claim 1, further comprising the steps of:

(3-i) dividing an unbalance amount range which is measurable prior to the unbalance correction into a plurality of sub-ranges,

(3-ii) executing the steps of (1-i) to (1-vi) for each of the unbalance amount sub-ranges to compare the number of times when the angular deviation of the unbalance position is 0° ±X1° with the number of times when the angular deviation of the unbalance position is 180° ±X1°, and

(3-iii) re-setting an unbalance correction amount for the unbalance amount sub-range in accordance with the higher number of times in step (3-ii).

4. (Currently amended) The method according to claim 1, further comprising:

(4-i) displaying a current condition of the balancing machine including a finally determined unbalance position error range, a rate of products having a good quality, and a correction amount error; and

(4-ii) automatically stopping an operation of the balancing machine in accordance with self-determination of the balancing machine when a current machine condition value reaches a predetermined value at which it is impossible for the balancing machine to operate, and warning the operator of the current machine condition.

5. (Currently amended) The method according to claim 1, wherein the compensation for the unbalance correction position in step (1-vii) is carried out by correcting only the unbalance correction amount.

6. (Currently amended) The method according to claim 1, wherein the compensation for the unbalance correction position in step (1-vii) is carried out by correcting both the unbalance correction position and the unbalance correction amount based on a value obtained by vector-calculating the measured unbalance position and unbalance amount.

7. (Currently amended) The method according to claim 1, wherein the compensation for the unbalance correction position in step (1-vii) is carried out by repeatedly performing the unbalance correction under condition in which the unbalance correction position is optionally shifted with reference to 0° or 180°, storing a correction rate at every unbalance correction, calculating a maximum one of stored correction rates, and correcting the unbalance correction position based on the calculated maximum correction rate.

8. (Currently amended) The method according to claim 1, further comprising:

storing, as basic data, cutting data exhibiting a predetermined high correction rate or more so that the basic data is used as recovery data when degradation in correction rate occurs.

9. (Currently amended) The method according to claim 8, further comprising:

Automatically recovering the stored basic data as cutting data when the correction rate is reduced to a predetermined value.

7. The above examiner's amendment was made per the applicant's instructions in the interview and found in the interview summary of 14 March 2006.

**Prior Art**

8. The prior art made of record and not relied upon is considered pertinent to applicant;

I. Art A of Hines et al., US 5,199,992 in class 118/669 is cited for the apparatus for single station balancing and correcting of rotation armature work pieces using the workstation 28 for testing and correction of balance in figure 1. He teaches three major variables influencing the balance correction in lines 15-35 of column 2 and teaches corrections for varying radii in line 45 of column 2. He further teaches the master machine for testing and correction of rotational balance in armatures in figure 1 and in

lines 65-66 of column 3. He further discloses pick up sensors with the over arm drive member 18 in line 19 of column 7.

II. Art B of Hines et al., US 5,505,083 in class 73/462 is cited for the split station modular balancing and correcting machine allowing the early removable of the 10 in figure 2. He further teaches the pick and place transfer systems in line 31 and teaches multi-station balancing and correcting devices with simplicity in components and the versatility of production in lines 60 of column 3. He further discloses computer control of the tooling and components of the balancing using the controller 41 in the work station as disclosed in lines 25-45 of column 6.

***Allowable Subject Matter***

1. Claims 1-9 are allowed.

2. The following is an examiner's statement of reasons for allowance:

The method for automatically compensating for an unbalance correction position and compensating for the correction amount in the balancing machine with steps for measuring and determining and correcting the initial unbalance in the spinning rotation by measuring the angular deviation of the rotation balance deviation to provide a computation and correction by determining the angular deviation of the unbalanced positions to provide for correction of the imbalance and determining the correction amount based on a value obtained by vector calculating the measured unbalanced position and unbalance amount is not found in the cited art of record.

The method in claim 1 for a method of automatically compensating for an unbalance correction position and compensating for the correction amount in the

balancing machine with steps of "measuring an unbalance amount and an unbalance position of a rotor completing a primary unbalance correction thereof"...[and] with the steps of "determining whether the initial unbalance amount before the unbalance correction is within the range of set value, which is correctable by a one-time correction" with steps of "incrementing counter if it is determined that the initial unbalance amount is within the range of set value in step (ii)"...[and] with steps of "determining whether the unbalance amount measured in step (i) is larger than a good-quality reference value for determining whether the rotor has a bad quality or good quality"...[and] with the steps of "measuring angular deviation between the unbalance positions of before and after the unbalance correction when the measured unbalance amount is larger than the good-quality reference value in step (1-iv)" with the steps of "determining whether the angular deviation of the unbalance positions measured in step (1-v) is 0° ± X1° and 180° ±X1° (0 < X1 < 5) or 0° +X2° and 180° +X2° (X1 < X2 < 90)"...[and] "compensating unbalance correction position and amount"...[and] further comprising the steps of "comparing the number of times when the angular deviation of the unbalance position is 0° +X2° and 180° +X2° with the number of times when the angular deviation of the unbalance position is 0° -X2° and 180° -X2° when the counter from step (iii) reaches the value set by an operator for calculation of average value"...[and] combined with the steps of "compensating the angle for differences in angular deviation according to the larger number of times in step (a)"...[and] with the explicit steps for "comparing the number of times when the angular deviation of the unbalance position is 0° ±X1° which occurs when insufficient unbalance correction is achieved at an accurate correction

position with the number of times when the angular deviation of the unbalance position is 180° ±X1° which occurs when excessive unbalance correction is achieved at an accurate correction position" with the steps of "compensating for the unbalance correction amount by increasing the unbalance correction amount if the number of times for 0° ±X1° is larger or by reducing the unbalance correction amount if the number of times for 180° ±X1° is larger." is not found in the cited art of record.

The prior Art A of Hines et al., teaches the apparatus for single station balancing and correcting of rotation armature work pieces using the workstation 28 for testing and correction of balance in figure 1. He teaches three major variables influencing the balance correction in lines 15-35 of column 2 and teaches corrections for varying radii in line 45 of column 2. He further teaches the master machine for testing and correction of rotational balance in armatures in figure 1 and in lines 65-66 of column 3. He further discloses pick up sensors with the over arm drive member 18 in line 19 of column 7.

The prior Art B of Hines et al., teaches the split station modular balancing and correcting machine allowing the early removable of the 10 in figure 2. He further teaches the pick and place transfer systems in line 31 and teaches multi-station balancing and correcting devices with simplicity in components and the versatility of production in lines 60 of column 3. He further discloses computer control of the tooling and components of the balancing using the controller 41 in the work station as disclosed in lines 25-45 of column 6.

Therefore, the prior art Hines et al., and The prior art of Hines et al., in combination or alone does not teach the present limitation of the claimed combination limitation.

It is these limitations expressed in each of these claims and not found, taught, or suggested in the prior art of record, that makes these claims allowable over the prior art.

Claims 2-9 dependent on the allowed independent claim 1 are allowed at least for the reasons cited above.

***Conclusion***

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor J. Taylor whose telephone number is 571-272-2281. The examiner can normally be reached on 8:00 to 5:30 PM.

4. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 571-272-2863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center at 866-217-9197 (toll-free).

VJT 14 March 2006

MICHAEL NGHIEM
PRIMARY EXAMINER